

CURRENT FLORICULTURE PRODUCTION CONDITION AND IMPORTANCE IN INDIA

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1. INTRODUCTION & HISTORICAL PERSPECTIVE

Floriculture in India has transitioned from a traditional aesthetic pursuit into a high-value commercial agribusiness. Historically rooted in the country's cultural heritage, flowers have been celebrated since the Vedic era for their spiritual, social, and cosmetic significance. References in ancient texts like the Rigveda highlight the integration of ornamental flora into daily rituals and state ceremonies. For centuries, cultivation was restricted to small-scale backyard gardens or dedicated temple fields focusing on native fragrant species like jasmine (*Jasminum* spp.), marigold (*Tagetes* spp.), and rose (*Rosa* spp.).

The structural paradigm shifted dynamically during the post-Green Revolution era, specifically in the early 1990s, when economic liberalization opened channels for global agricultural integration. Recognizing the favorable microclimatic variations across the country, the Government of India classified floriculture as a "thrust area". Over the subsequent three and a half decades, intensive policy interventions shifted farming models from domestic subsistence toward precision-driven, export-oriented setups. Today, Indian floriculture represents one of the fastest-growing segments of commercial horticulture, serving as a powerful engine for agrarian diversification, rural income generation, and foreign exchange earnings.

2. STATUS OF FLORICULTURE: AREA AND PRODUCTION DYNAMICS

India's total horticultural footprint has achieved major milestones, with total production touching approximately **354.75 million tonnes**. Within this framework, floriculture occupies a highly specialized, capital-intensive niche. Commercial cultivation is broadly divided into two main components: loose flowers and cut flowers.

STRUCTURAL CLASSIFICATION OF INDIAN FLORICULTURE

Loose Flowers

- **Harvesting:** Plucked without stems or stalks directly from the calyx.
- **Key Species:** Marigold, Jasmine, Tuberose, Chrysanthemum, Crossandra.
- **Primary Channels:** Traditional wholesale markets, garland manufacturing, religious offerings, social rituals, and industrial essential oil extraction.

Cut Flowers

- **Harvesting:** Harvested with long, healthy floral stems attached.
- **Key Species:** Dutch Rose, Gerbera, Carnation, Anthurium, Lilium, Gladiolus.
- **Primary Channels:** Modern cold-chain retail, bouquets, corporate events, vase arrangements, and premium international export markets.

The area under flower cultivation spans across diverse agro-climatic zones. According to updated institutional datasets from the Ministry of Agriculture & Farmers Welfare, production patterns show consistent growth: Loose flowers dominate the volume of domestic production, reaching a peak output of approximately **2,284.46 metric tons**. These are primarily utilized for garlands, religious offerings, and institutional decor. Conversely, cut flowers, characterized by long, sturdy stems tailored for bouquets, vase arrangements, and export markets, reached **946.54 metric tons**, reflecting a strong year-on-year expansion of **10.78%** driven by corporate retail demands.

Major Floricultural Zones and State-wise Contributions

The spatial distribution of commercial flower production is governed by geographical suitability and access to cold-chain infrastructure:

Region / Key State	Primary Varieties Cultivated	Production Focus	Infrastructure Hubs
Karnataka	Rose, Jasmine, Gerbera, Anthurium	Dual: Traditional loose flowers and premium export-grade cut flowers	International Flower Auction Bangalore (IFAB), precision biotech clusters
Tamil Nadu	Jasmine, Tuberose, Marigold, Crossandra	Dominant leader in open-field traditional loose flower volume	Madurai Jasmine processing centers, Coimbatore wholesale terminals
West Bengal	Rose, Gladiolus, Chrysanthemum, Marigold	High-density field cultivation serving Eastern and North-Eastern demands	Panskura flower market, Kolkata logistical gateways
Maharashtra	Dutch Rose, Carnation, Gerbera, Orchid	Protected greenhouse cultivation optimized for institutional supply chains	Pune and Nashik agro-export zones, Mumbai port cold-handling yards

3. ECONOMIC AND SOCIO-CULTURAL IMPORTANCE

Rural Livelihoods and Economic Returns

Floriculture generates significantly higher net returns per unit of land than traditional field crops like wheat or cotton. The average annual income of smallholders transitions upward post-adoption of high-value horticultural regimes. For instance, localized micro-economic evaluations of specialized crops—such as the Geographical Indication (GI) protected Jasmine cultivation in Huvina Hadagali—reveal that flower farming accounts for up to **40%** of overall household income. During peak festive windows, the income multiplier increases significantly, offering rapid cash liquidity to rural families.

Employment Generation and Women Empowerment

A defining metric of the floriculture sector is its labor-absorptive capacity. Open-field and protected floriculture are labor-intensive, requiring specialized manual intervention for weeding, pruning, harvesting, grading, and post-harvest assembly. Furthermore, this sector drives rural women's empowerment. Over **60%** of post-harvest management tasks—including flower plucking, stringing garlands, sorting, and packaging—are performed by female laborers. This structural trend aligns directly with Sustainable Development Goal 5 (Gender Equality) and SDG 1 (No Poverty) by creating localized, dignified employment opportunities within village micro-economies.

Industrial Value Chains

Beyond fresh sales, floriculture serves as the foundational feedstock for several secondary industries:

1. Essential Oils & Aromatherapy: Extraction of concrete and absolute oils from species like *Rosa damascena* and *Jasminum grandiflorum* for luxury perfumery, cosmetic lines, and alternative medical applications.

2. Nutraceuticals & Natural Pigments: Industrial processing of marigold petals to extract Lutein and xanthophylls, which are widely exported for poultry feed colorants and premium human eye-health supplements.

3. Dry Flower Industry: Processing of dried stems, seed pods, and petals, with India holding a dominant share in the European and American home-decor market segments due to lower operational fabrication costs.

4. CURRENT CULTIVATION PRACTICES AND TECHNOLOGICAL ADVANCEMENTS

Traditional Open-Field Cultivation

Traditional open-field farming relies heavily on natural climatic cycles. This method dominates the production of hardy loose flowers such as African Marigold, local pink roses, and tuberose. While cost-efficient regarding capital outlays, it exposes growers to climate vulnerabilities, unpredictable pest infestations, and seasonal price gluts.

Protected Cultivation Systems

To meet international quality parameters, progressive growers utilize modern structural tech:

Step 1: Greenhouse Structure Setup

Erection of naturally ventilated polyhouses or climate-controlled multi-span structures wrapped in 200-micron UV-stabilized polyethylene films to exclude external environmental extremes and optimize active photosynthetic radiation.

Step 2: Substrate and Soil Solarization

Execution of soil solarization during peak summer (May–June) using clear polythene sheets to raise substrate temperatures. This is paired with beneficial bioagents like *Trichoderma viride* and *Pseudomonas fluorescens* to eliminate root-knot nematodes (*Meloidogyne incognita*) and soil-borne fungal pathogens without chemical toxicity.

Step 3: Precision Fertigation and Micro-irrigation

Installation of automated drip irrigation systems connected to venturi injectors. Water-soluble nutrients (N, P, K) and chelated micronutrients are delivered directly into the active root zone based on the plant's growth stage, minimizing runoff and maximizing fertilizer use efficiency.

Step 4: Automated Environmental Manipulation

Deployment of relative humidity and ambient temperature sensors. These sensors trigger motorized thermal screens, misting systems, and fan-and-pad evaporative cooling arrays to keep conditions within optimal physiological boundaries.

Hi-Tech Interventions

Micropropagation (Tissue Culture): Commercial laboratories mass-produce disease-free, genetically uniform planting materials. This technology supplies millions of tissue-cultured elite clones of gerberas, carnations, and orchids annually, bypassing seed-borne variations.

Integrated Pest & Disease Management (IPDM): Transitioning away from calendar sprays of synthetic chemical loads, modern greenhouses utilize yellow/blue sticky traps, pheromone lures, and targeted bio-pesticides (*Bacillus thuringiensis*, *Beauveria bassiana*) to keep target vectors below economic injury levels.

5. EXPORT POTENTIAL, LOGISTICAL INFRASTRUCTURE, AND CHALLENGES

Export Dynamics and APEDA's Role

Indian floriculture products are shipped globally, with prime export destinations including the United States, the Netherlands, the United Kingdom, Germany, and the United Arab Emirates. The Agricultural and Processed Food Products Export Development Authority (APEDA) has institutionalized several export enhancement programs. These focus on the modernization of terminal markets, financial assistance for reefer transport vans, and the establishment of dedicated walk-in cold storage facilities at major international exit air-cargo terminals (such as Mumbai, Delhi, Bengaluru, and Chennai) to establish a seamless farm-to-flight supply chain.

Critical Bottlenecks and Constraints

Despite high growth trajectories, structural constraints limit the sector's global competitiveness. Cold chain fragility remains a persistent issue, leading to high percentage losses during post-harvest handling due to disruptions in temperature control between farm-gate collection and regional airport freight lines. Escalating input costs also present a substantial entry barrier; high initial capital investment is required to set up smart polyhouses, alongside rising electricity costs and premium prices for imported patented varieties from European breeders.

Furthermore, strict Phytosanitary Barriers, including Maximum Residue Limits (MRL) and non-tariff quarantine barriers imposed by importing nations, require highly precise chemical residue control. Lastly, global competition poses a strong threat; competitors like Kenya, Ethiopia, and Colombia have established highly integrated air-freight networks and lower operational costs, challenging India's market share in the European auction markets.

6. GOVERNMENT POLICIES AND SUPPORT SYSTEMS

To mitigate production bottlenecks and safeguard farm investments, the Ministry of Agriculture & Farmers Welfare executes comprehensive financial and research programs:

Mission for Integrated Development of Horticulture (MIDH): Operates as a centrally sponsored scheme providing financial subsidies ranging from **35%** to **50%** for establishing greenhouses, shade-net facilities, plastic mulching, and low-cost anti-hail nets.

Agriculture Infrastructure Fund (AIF): Offers medium-to-long term debt financing facilities with a **3%** interest subvention for building post-harvest infrastructure, including cold rooms, pack-houses, and primary processing centers.

ICAR - Directorate of Floricultural Research (DFR): Based in Pune, ICAR-DFR spearheads scientific research on crop improvement, standardized package of practices (PoP) for exotic cut flowers, and the documentation of native landraces. It works in coordination with the All India Coordinated Research Project (AICRP) on Floriculture across multiple state agricultural universities (SAUs).

Rashtriya Krishi Vikas Yojana (RKVY) & National Horticulture Board (NHB): Support regional cluster development programs, technology incubation centers, and direct financial credit linkages for agro-startups and Farmer Producer Organizations (FPOs).

7. FUTURE OUTLOOK AND RESEARCH PRIORITIES

The future of Indian floriculture lies in integrating sustainability with precision technology. Research priorities must pivot heavily toward breeding climate-resilient flower varieties that can tolerate abiotic thermal stress without losing architectural stem quality or vibrant petal pigmentation. Expanding domestic consumption driven by rapid urbanization, corporate gifting cultures, and e-commerce supply chains offers an excellent domestic buffer against international market volatility. By driving digital farm-management tools, adopting eco-friendly bio-inputs, and building integrated rural cold-chain clusters through public-private partnerships, India can strengthen its position in the international floral trade, securing high returns for its farming community.

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